



This research shows that it is possible to produce an ultra-high resveratrol peanut suitable for cost-effective production and marketing by limited resource farmers so that they make economic incomes on their lands. This work contributes to USDA priority number 2, *Animal Health and Production and Animal Products*, and NIFA challenge area number 5, *enhancing Global Food Security*.

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## Ultra-High Resveratrol Specialty Peanut Seeds

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### Who cares and why?

Peanut production and trade constitute at least \$4 billion industry in the US, with Texas ranking second to Georgia as the largest producer. But only mega-farmers indulge in this globally lucrative production of the best quality vegetable oil because limited resource farmers are unable to market their produce at the world market. However, peanut is the most popular snack-nut in the world. Plant Systems research scientists at Prairie View A&M University therefore sought to create specialty peanuts with other nutritious added values that are beneficial to human health so that limited resource farmers could produce and distribute the peanuts to whole food and local markets. There are at least 6 million limited resource farmers in Texas.

Resveratrol is the anti-oxidative phytochemical nutritious constituent of peanut seeds. It has human health beneficial effects associated with long life extension; reduction of risks of inflammatory cancer and cardiovascular diseases; amelioration of cholesterol levels, diabetes, and neurological diseases. Ordinarily, peanut seeds have variable and very low (less than 25 microgram per gram) resveratrol contents which has prevented the marketing of high resveratrol peanut as a consistent added value dietary produce. With the increasing popularity of boiled peanut and peanut-based products in restaurant chain menus, high resveratrol peanut may be a very attractive and convenient in-shell snack food dietary supplement of the phytochemical resveratrol compounds.

### What has the project done so far?

In the past decade, Prairie View A&M University (PVAMU) received funding from USDA/Evans-Allen Program for multi-disciplinary research studies that demonstrated the enhancement and doubling of the yields of several food crops including peanut, soy bean, black eye peas, corn, sweetpotato, and yam tuber through the application of basic and applied sciences and biotechnology in order to position the world to stave-off possible food crises, shortages and hunger, and increase food security for a rapidly increasing human population. Scientific journal publications and learned society presentations of the outcomes of these studies eloquently demonstrate that considerable progress has been achieved in understanding the scientific, agronomic and biotechnological bottle-necks in road ways towards sustainable cost-effective crop yield improvement.

In the peanut resveratrol research project, Plant Systems scientists at the College of Agriculture and Human Sciences applied mixtures of chemically reacting ratios (1:1:2) of nitrate, potassium, and phosphorous to peanuts growing under controlled conditions and in the University's farm plots. The harvested seeds of the treated and untreated control peanuts were tested for resveratrol contents using HPLC (high performance liquid chromatography) method. The treated peanuts contained 130 microgram resveratrol per gram, while the untreated control contained 9 microgram per gram. This is the ultra-high resveratrol specialty peanut suitable for sustainable production by limited resource farmers and marketing by them in restaurant menus snack, and in whole food stores. The research outcome has been reproduced with consistency throughout the past four years.



### What research is needed?

The high resveratrol peanut technology is ready for cooperative extension program (CEP) horticultural research trials on the field plots of limited resources farmers. Harvests from the CEP research will be

test-marketed (economic feasibility) in whole food stores, and at African, Asian, Latin-American etc restaurants.

### Impact Statement

Basic and applied research on peanuts resveratrol anti-oxidant, long life extending, anti-cancer, cardiovascular diseases-mitigating constituent demonstrate that treatment of peanuts growing under controlled conditions, and in the field with mixtures of nitrate, potassium, and phosphorus in their chemically reacting ratios of 1:1:2 tremendously increased the resveratrol contents from 9 microgram in the untreated control to 130 microgram per g of seed in the treated peanut. Peanut is the most popular in-shell snack nut accepted by all cultures in the world. This consistent ultra-high resveratrol peanut is suitable for cost-effective production and marketing by limited resources farmers so that they make economic incomes on their lands.

### Want to know more?

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**Additional links:** <http://www.umes.edu/ard/Default.aspx?id=46285>

**University and year:** Prairie View A&M University, 2014

This project was supported by Evans-Allen research funding.